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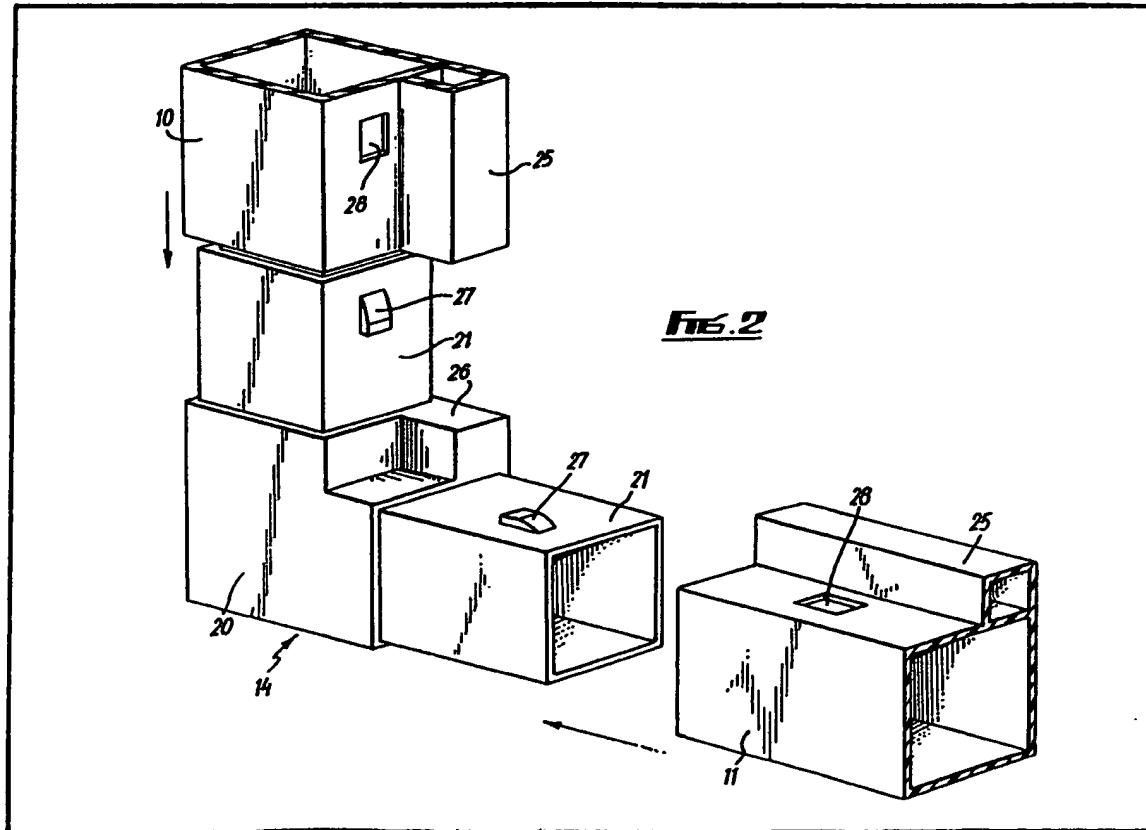
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(71) Applicant  
L.B. (Plastics) Limited,  
Firs Works, Nether Heage,  
Belper, Derby

(72) Inventors  
Leon George Litchfield,  
Terence Hardy  
(74) Agent  
Swindell & Pearson

has spigots of corresponding cross-section projecting from a body portion 20 at right angles to one another, to be a tight push fit in the open ends of the rectangular parts of the frame members. The junction pieces are retained in the frame members preferably by detents 27 on the spigots engaging in apertures 28 in the frame members. The frame members and junction pieces are suitably shaped to define a seating for a pane of glass, and recesses for retaining members and sealing strips for the glass. Internal reinforcing members such as tie bars may be provided.

## (54) Window Frame

(57) A window frame is formed of a plurality of hollow extruded plastics frame members 10, 11, connected at right angles to one another by plastics junction pieces 14. Each of the frame members has a part of rectangular cross-section and each junction piece



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*FIG. 1*

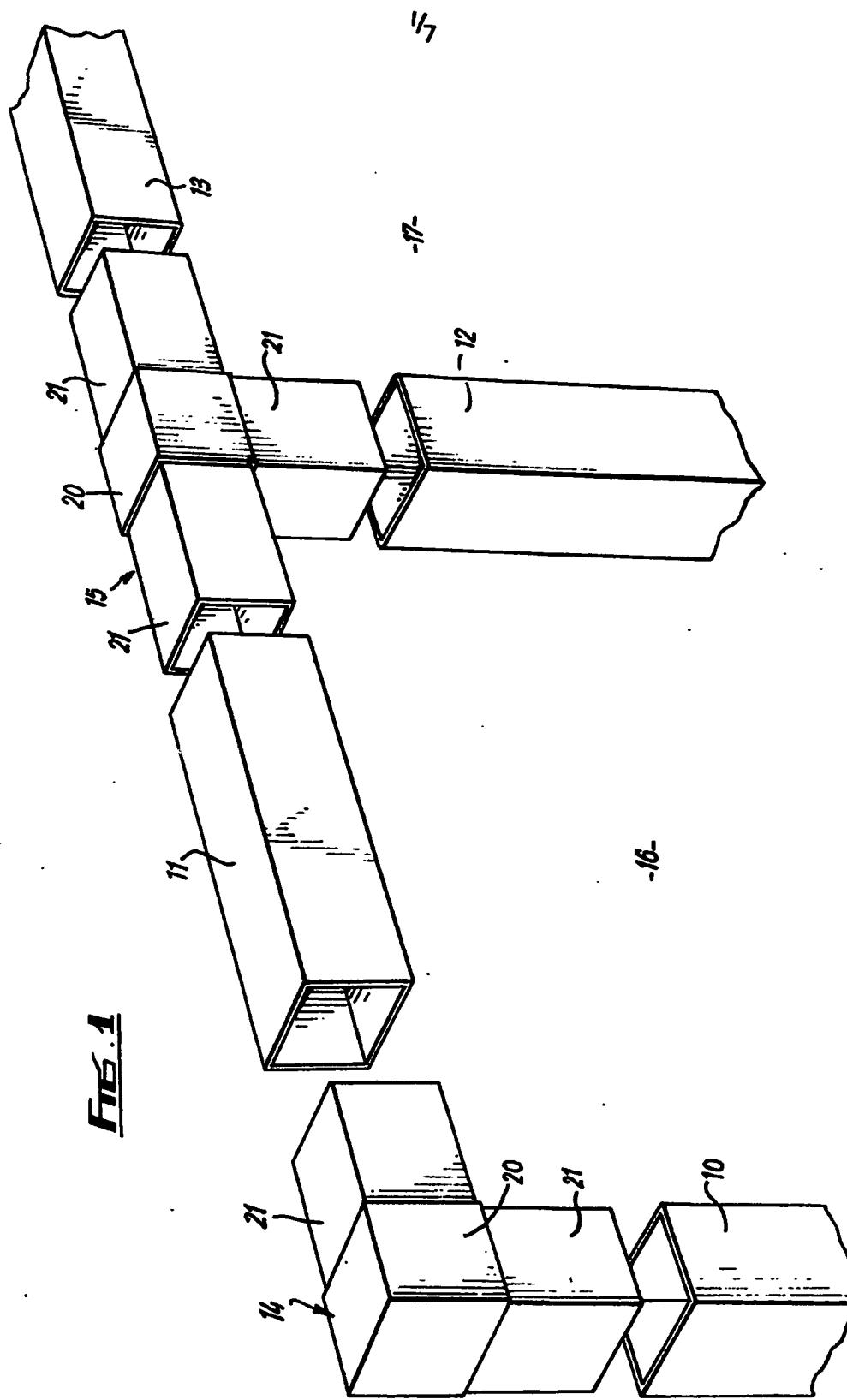
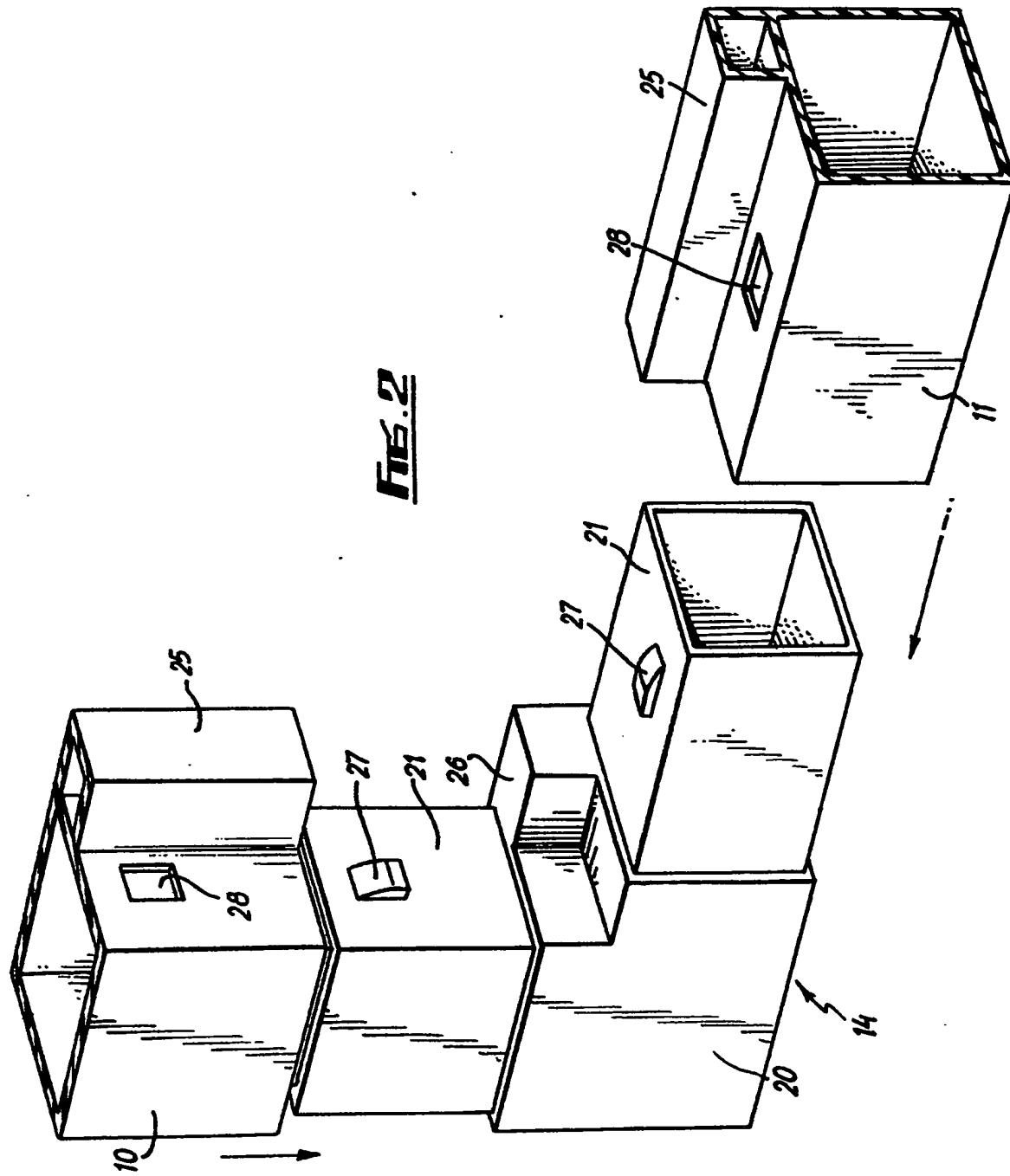
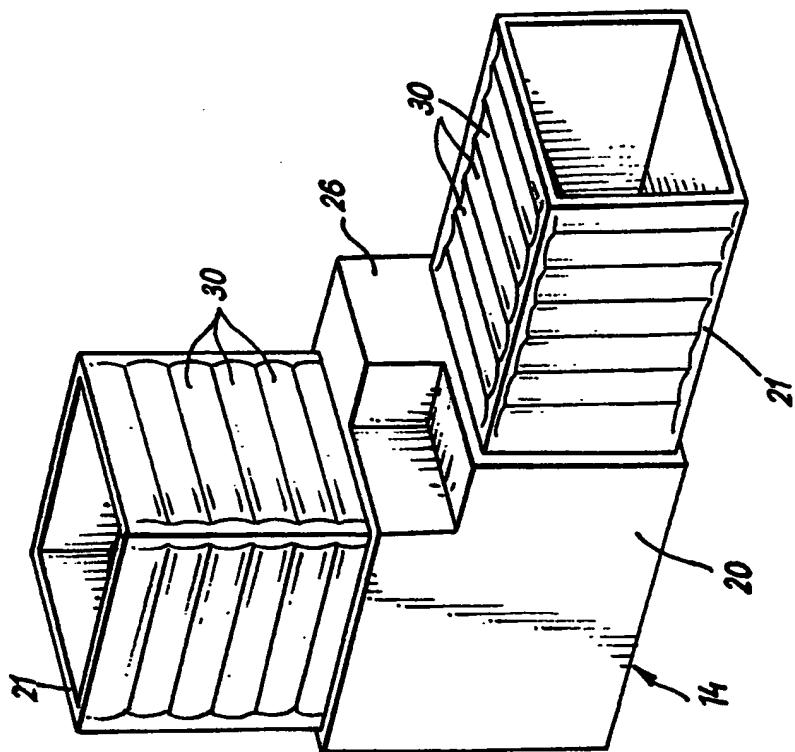
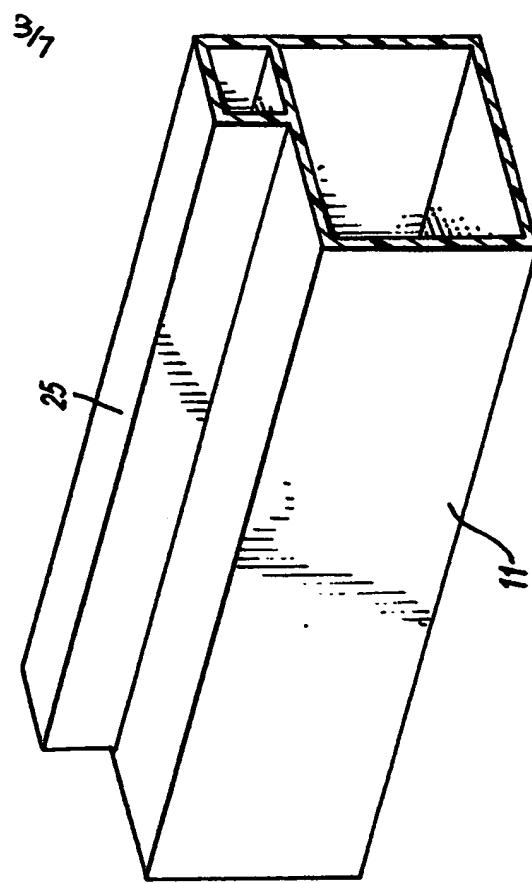


FIG. 2

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FIG. 3



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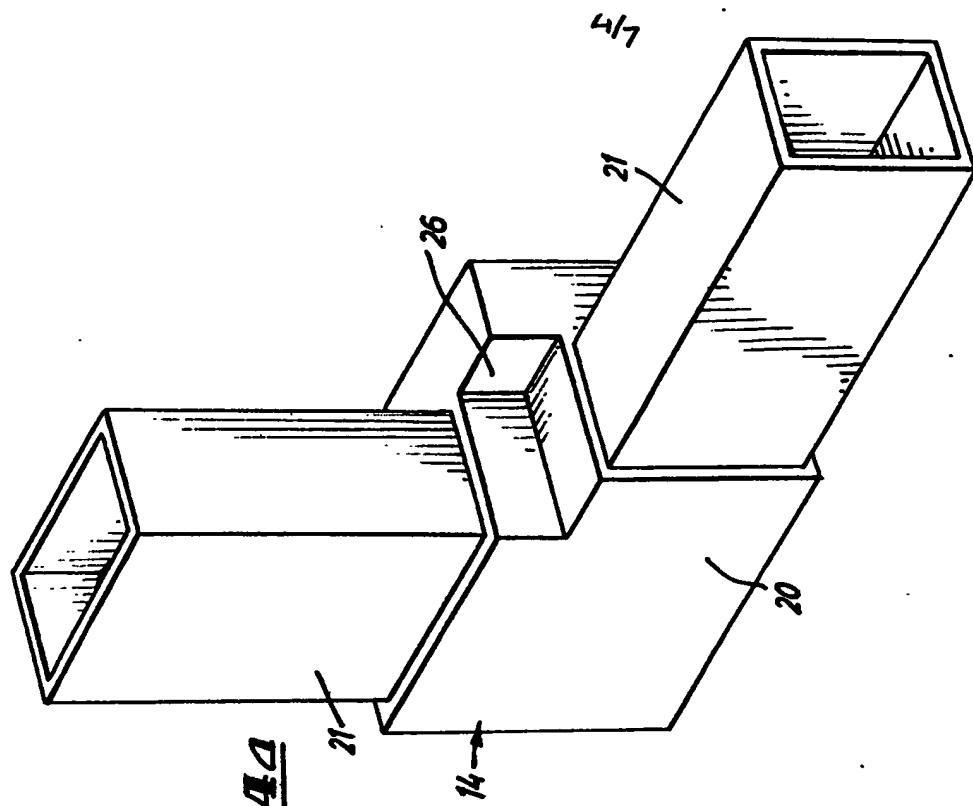


FIG. 4a

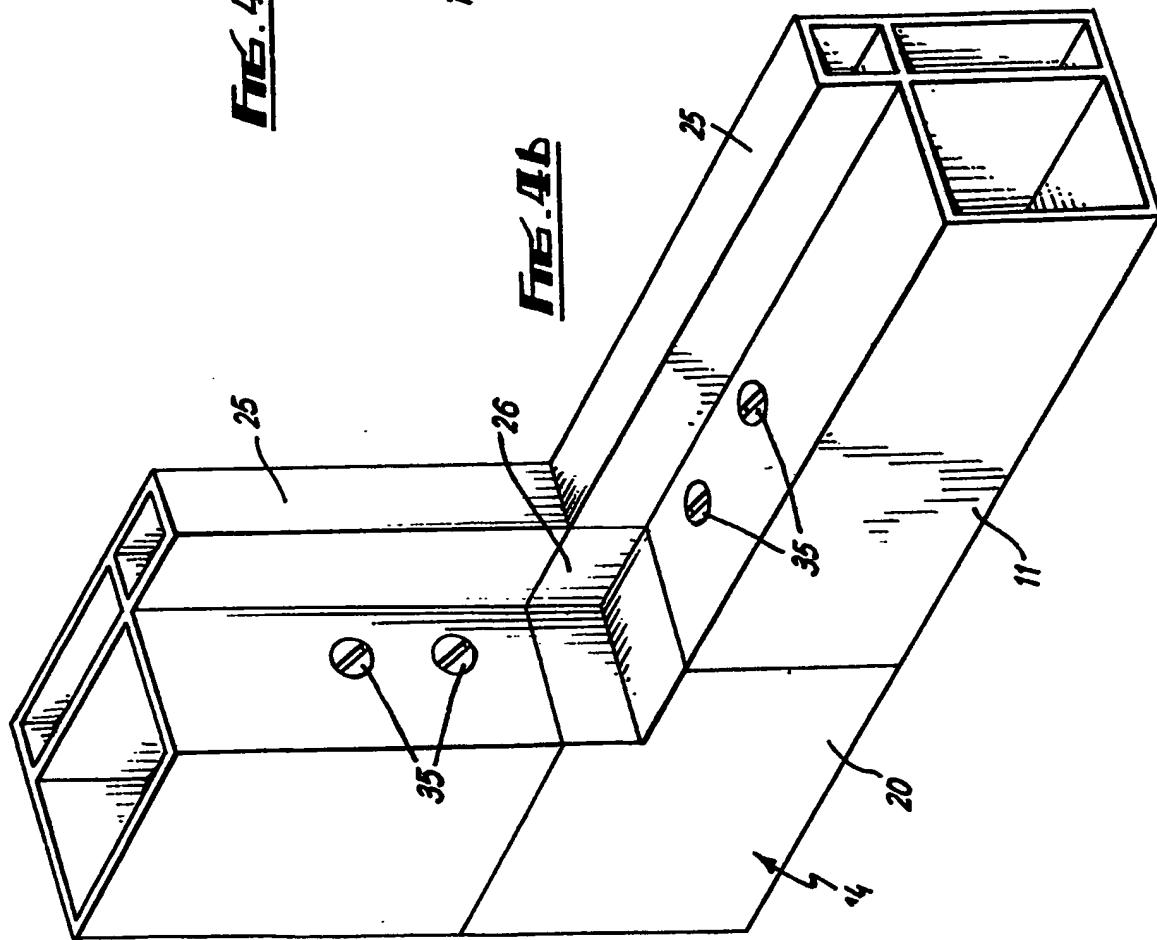
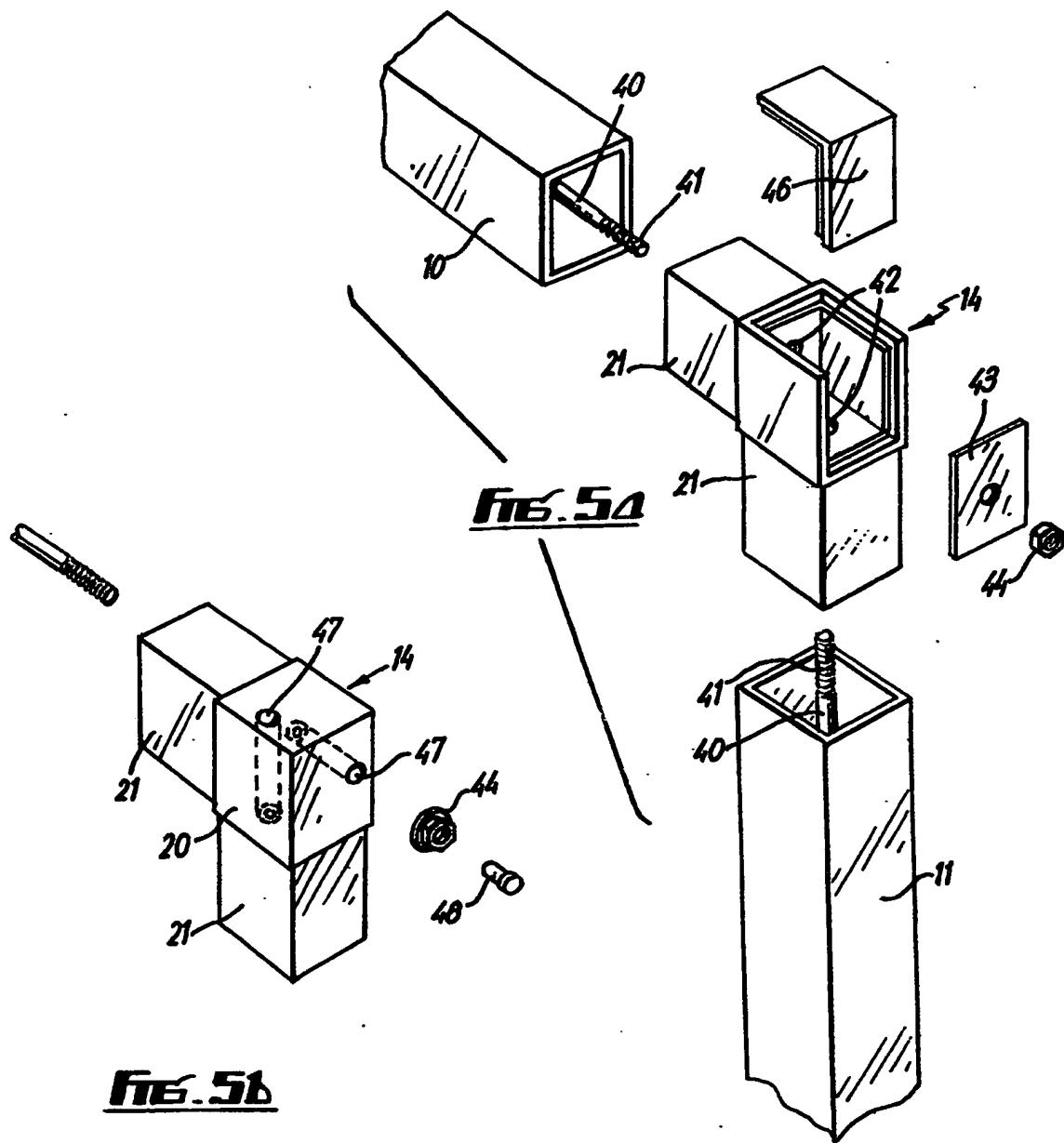
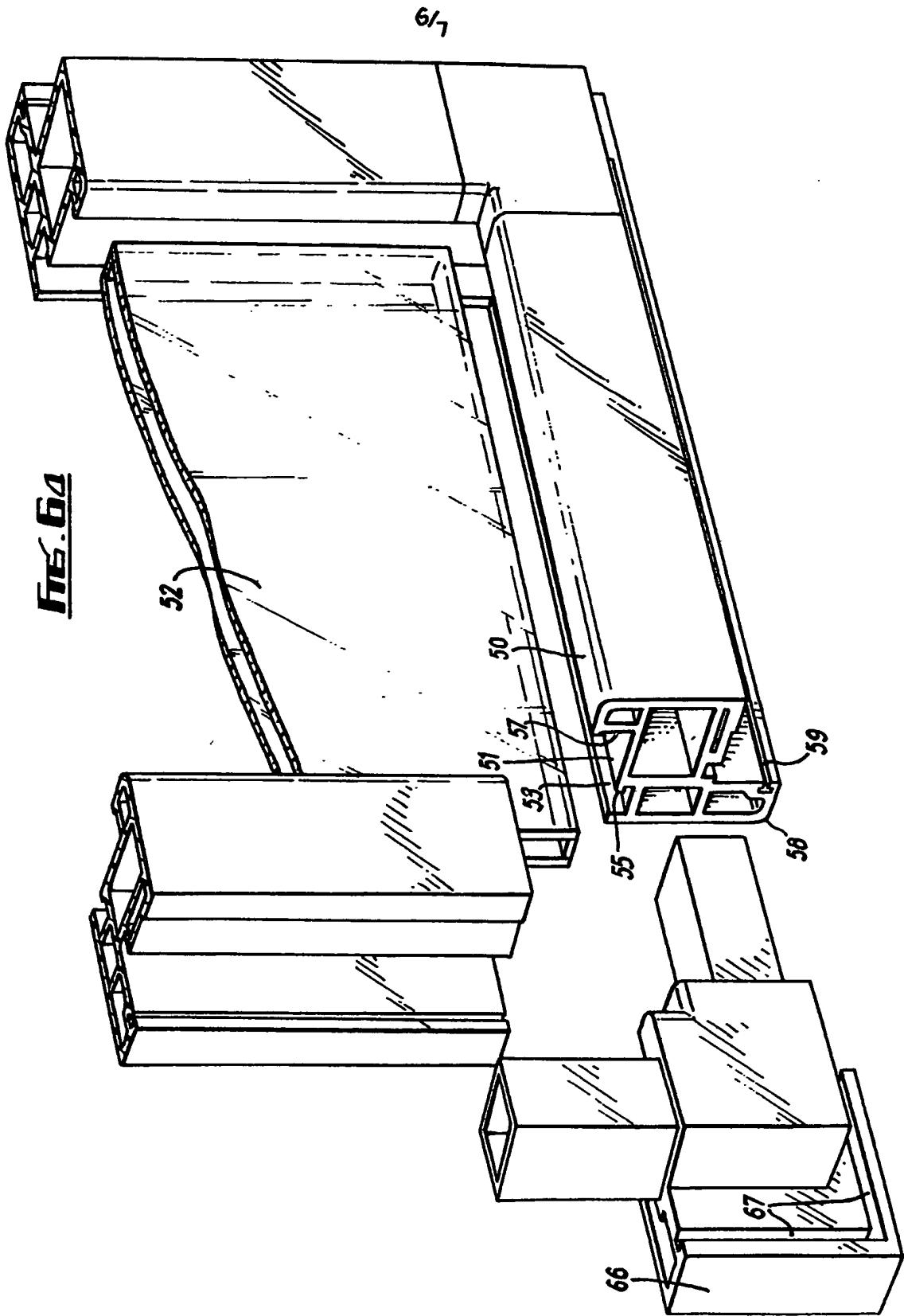


FIG. 4b



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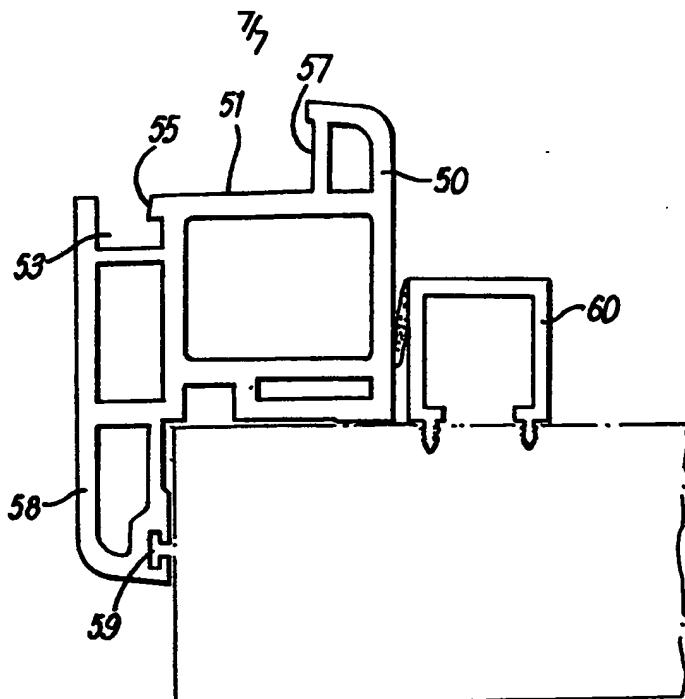


Fig. 6b

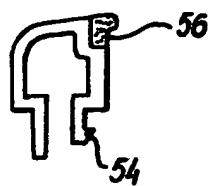


Fig. 6c

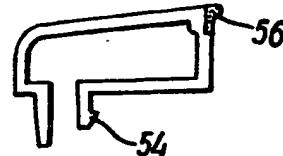


Fig. 6d

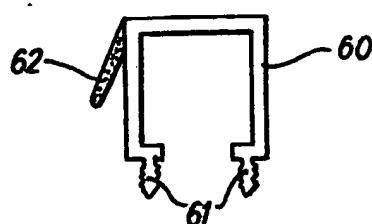


Fig. 6e

**SPECIFICATION**  
**Window Frames**

Traditionally window frames have been made of wood and have butted or mitred joints at their corners. Wooden frames however suffer disadvantages regarding maintenance and appearance and various attempts have been made to construct window frames from plastics material. In one such arrangement plastic frame members have been mitred at the corners and interconnected by fusing the butting edges together using a special tool. This and other proposals have however suffered from the drawback that it has not been possible to achieve sufficient rigidity of the assembled frame and resort has therefore been had to the incorporation of internal reinforcing members or to the use of metal components. These expedients considerably increase the complexity and cost of the window frame.

It is an object of the present invention to provide a window frame in which the above difficulties are obviated or mitigated.

According to the invention there is provided a window frame comprising a plurality of hollow frame members of extruded plastics construction interconnected at right angles to one another by plastics junction pieces each of which has a body portion and spigots projecting from the body portion in at least two directions at right angles to one another, the spigots being adapted to form a tight push fit within the open ends of the frame members, and securing means being provided to retain the components in their assembled condition.

In this way mitring of ends of the frame members is not required and the spigots form an internal reinforcement for the ends of the frame members at the corner regions of the frame.

Preferably the frame members are at least in part of rectangular cross section, the spigots on the junction pieces being of corresponding cross-section whereby to contact the inner surface of said part of the frame members on all four sides.

Preferably the outer surfaces of the body portion are adapted to lie flush with the outer surfaces of the associated frame members when the components are in their assembled condition.

Preferably also the securing means comprises projecting detents formed on said spigots and engageable in complementary apertures adjacent the ends of the associated frame members. The detents and apertures are preferably provided on surfaces of the frame members and junction pieces which are obscured from view when the frame is in its position of use.

Alternatively or in addition, the securing means may comprise screws arranged to pass through openings in the ends of the frame members and engage threadedly with said spigots or may comprise ribbing on the spigots serving in association with a solvent adhesive to bond the frame members and spigots to one another.

If desired internal reinforcing members may

pass through the frame members and junction pieces to increase the rigidity of the assembled structure.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Fig. 1 is an exploded perspective view showing the general principle of construction of a window frame according to the invention;

Fig. 2 is an exploded perspective view showing a corner of one embodiment of window frame construction;

Fig. 3 is a view similar to Fig. 2 showing an alternative embodiment;

Figs. 4a and 4b show a further embodiment of the invention with the connecting piece shown separately in Fig. 4a and assembled to form a corner of a frame in Fig. 4b;

Figs. 5a and 5b show two alternative methods of incorporating internal reinforcement;

Fig. 6a shows a more practical form of frame construction; and

Figs. 6b to 6e are cross-sections through components of the frame construction shown in Fig. 6a.

Referring to Fig. 1, a window frame is constructed from hollow extruded plastics frame members 10, 11, 12 and 13 interconnected by junction pieces 14 and 15. Four junction pieces of

the kind shown at 14 are utilised, one at each of the four outer corners of the frame. Two T-shaped junction pieces of the kind shown at 15 are incorporated in the top and bottom members of the frame to provide a frame having side-by-side openings 16, 17 in which panes of glass (not shown) are mounted to form the completed window.

Both forms of junction piece 14, 15 incorporate a body member 20 the outer surfaces

of which are dimensioned to lie flush with the outer surfaces of the adjacent frame members, spigots 21 projecting from the body portion in two directions at right angles. The L-shaped junction pieces 14 are provided with two such

spigots and the T-shaped junction pieces 15 with three spigots. The spigots are of hollow box-like form and form a close push-fit within the open ends of the associated frame members. The outer surfaces of the spigots therefore abut all four

internal faces of the associated frame members and serve to rigidify and strengthen the assembled frame.

Fig. 1 shows the general outline of the system only and does not show any means for retaining the components in their assembled condition nor for supporting the window glass. Fig. 2 shows an embodiment of the invention in which a projecting lip 25 is provided on each of the frame members to form an abutment for the window

glass or for an inner movable window frame in the case where the illustrated frame is an outer fixed frame. A projecting lug 26 is provided on each of the connecting pieces 14 to form a continuation of the lip 25 when the components are

interconnected. Securing means is provided on the connecting pieces to retain the components in their assembled conditions. The securing means comprises projecting detents 27 on the inner 5 surface of the spigot members, the detents being adapted to clip into arrangement with complementary apertures 28 formed adjacent the ends of the associated frame members. When the components are assembled the plastic material of 10 the frame members deforms to allow the detents to pass into the open ends of the frame members until they reach the apertures 28 whereupon the detents engage the apertures to lock the components securely together. As the detents are 15 formed on the inwardly directed surfaces of the spigots, when the window is assembled the detents are hidden from view by the means used to secure the glass in the frame or by the inner frame in the case where the illustrated frame is an 20 outer frame. The detents are of inclined ramp-like form to facilitate engagement of the connecting members in the ends of the frame members. T-shaped frame members similar to those illustrated in Fig. 1 may of course be provided to divide the 25 main frame into two or more sections using intermediate frame members as shown in Fig. 1.

Fig. 3 shows an alternative embodiment in which the projecting detents and complementary recesses are replaced by a series of ribs or flutes 30 formed on the spigots of the junction pieces. These ribs or flutes 30 are used in association with a suitable adhesive, preferably of the solvent type, to form alternative securing means for retaining the frame members and junction pieces 35 in their assembled condition. In other respects the components shown in Fig. 3 are similar to those shown in Fig. 2.

Figs. 4a and 4b show an alternative embodiment in which the components are 40 interconnected by means of self tapping screws 35. These are preferably screwed through the frame members into the spigots of the junction pieces at the inwardly directed surfaces of the frame members in order that the screw heads will 45 be concealed when the window glass or the inner frame is installed. If desired suitable holes may be provided in the frame members to receive the screws and assist in correct assembly.

Figs. 5a and 5b illustrate two means of 50 incorporating internal reinforcement in the frame construction. In Fig. 5a tie bars 40 having threaded ends 41 extend through the frame members and through apertures 42 formed in the body portions of the junction pieces. Metal 55 pressure plates 43 are placed over the ends of the tie bars and nuts 44 may then be screwed on to the threaded ends 41 to tension the tie bars and rigidify the structure. In order to enable access to be gained to tighten the nuts the body portions of 60 the junction pieces may be provided with removable cap 46 giving access to the interior of the body portion. Alternatively as shown in Fig. 5b apertures 47 may be provided in the body portion to enable a suitable tool to be inserted. The 65 apertures may subsequently be closed by

removable plugs 48. In a modification of the arrangements shown in Figs. 5a and 5b a single flexible wire member may extend around the entire frame and be anchored and tensioned at 70 one corner only.

Figs. 6a shows a more practical form of inner or opening window frame which incorporates an inwardly projecting rib 50 defining a seating 51 for the window glass 52 and a recess 53 adapted 75 to accommodate a retaining member for the glass. In the case of single pane windows the glass is retained by a strip of the kind shown in Fig. 6d and in the case of a double-glazed window by a strip of the kind shown in Fig. 6c. These strips are provided with hooked formations 54 which engage with a projection 55 in the recess 53 to secure the strips in place when they are pushed into the recess. The strips also incorporate resilient insert strips 56 which butt against the 80 inner face of the glass to form a combined cushion and seal. The inner face of the upstanding rib 50 is provided with an undercut recess 57 into which a sealing strip (not shown) is inserted to butt against the outer face of the glass.

85 90 The frame is also provided with an outwardly directed portion 58 which projects beyond the edges of the main body of the frame to seat against the outer surface of the outer fixed window frame in which the illustrated frame is mounted in use. The projecting portion 95 incorporates a groove 59 into which a flexible sealing strip (not shown) may be inserted. This acts as an additional seal and prevents ingress of moisture between the inner and outer frames by capillary action.

100 Fig. 6c shows an inner abutment in the form of an extruded strip 60 provided with barbed projections 61 adapted to be engaged in grooves in the outer frame such that the strip 60 projects from the outer frame and forms an abutment for the inner frame as shown in broken lines in Fig. 6b. A flexible bead 62 is attached to strip 60 and abuts against the inner frame when the latter is closed to form a resilient seal. Where the outer frame is of wooden construction the provision of the strip 60 reduces wastage of wood compared with an arrangement where an abutment similar to the strip 60 is formed from the wood itself.

105 110 The junction pieces 65 used in association with the frame members are similar to those described in relation to Figs. 1 to 5 but include a forwardly projecting extension 66 corresponding in cross-section to the portion 58 of the frame members and incorporating slots (not shown)

115 120 corresponding to and forming extensions of the recesses 53 of the frame members and grooves 67 corresponding to and forming extensions of the grooves 59 in the frame members. The securing means for retaining the junction pieces 125 in engagement with the frame members are not shown in Fig. 6a but may take any of the forms previously described.

130 By virtue of the arrangements described it is possible to construct window frames from extruded plastics components in a simple and

effective manner. The construction of the frame members and junction pieces enables a positive connection between the components to be effected and the junction pieces contribute to the rigidity of the assembled frame. Except in the case where adhesive is utilised a positive and rigid connection is secured by dry assembly. Moreover in all instances save where adhesive is used the manner of interconnection is such that the components may be readily disassembled in the event of incorrect assembly, breakage or the like.

The frames described may constitute inner and/or outer window frames. For example, they may comprise inner or opening frames mounted in an outer frame of wooden construction as referred to above. In this way the outer wooden frame contributes strength to the window as a whole while the inner plastics frame improves the appearance of the frame and reduces maintenance. Alternatively the entire frame consisting of both inner and outer components may be constructed from plastics material in the manner described herein.

The upright and horizontal frame members may be of different cross-sectional size, the projecting spigots on the connecting members being of different size suited to the size of the frame members concerned. In some cases the projecting spigots may extend for different lengths dependant on the degree of rigidity it is desired to impart to the assembled frame.

Various modifications may be made without departing from the invention. For example, many different shapes and sizes of window frame can be constructed utilising components and junction pieces of suitable form. The frame opening may be divided either horizontally or vertically into separate openings or could be divided both horizontally and vertically, junction pieces having four projecting spigots being provided at the points where the vertical and horizontal frame members crossed. Various other means of interconnecting the components may be utilised and where detents and complementary apertures are utilised these may be of different shapes and sizes or a plurality of detents and apertures could be provided on each spigot.

#### Claims

1. A window frame comprising a plurality of hollow frame members of extruded plastics construction interconnected at right angles to one another by plastics junction pieces each of which has a body portion and spigots projecting from the body portion in at least two directions at right angles to one another, the spigots being adapted to form a tight push fit within the open ends of the frame members, and securing means being provided to retain the components in their assembled condition.

2. A window frame according to Claim 1, wherein outer surfaces of the body portion are adapted to lie flush with outer surfaces of the respective frame members when the components are in the assembled condition.

- 65      3. A window frame according to Claim 1 or 2, wherein the frame members are each at least in part of rectangular cross section, the spigots on the junction pieces being of corresponding cross section whereby to contact the inner surfaces of said parts of the frame members on all four sides.
- 70      4. A window frame according to Claim 3, wherein each of the frame members includes, at one side of said part, an inwardly extending rib defining a seating for a pane of glass, and at the other side of said part, an outwardly extending portion defining an abutment for a support arrangement, each of the body portions of the junction pieces having a configuration corresponding to that of the frame members.
- 75      5. A window frame according to Claim 4, wherein a recess is defined at each of said other sides of said parts of the frame members, and at corresponding locations in the body portions of the junction pieces for location therein of a retaining member for the pane of glass.
- 80      6. A window frame according to Claim 4 or 5, wherein each of the outwardly extending portions of the frame members and the corresponding portions of the body portions of the junction pieces has a recess for location of a sealing strip therein.
- 85      7. A window frame according to Claim 4 or 5, wherein each of the inwardly extending ribs and the corresponding portions of the body portions of the junction pieces has an undercut in a side face for location of a resilient strip therein.
- 90      8. A window frame according to any of the preceding claims, wherein the securing means comprises projecting detents formed on said spigots and engageable in complementary apertures adjacent the ends of the associated frame members.
- 95      9. A window frame according to Claim 8, wherein the detents and apertures are provided on surfaces of the frame members and junction pieces which are obscured from view when the frame is in its position of use.
- 100     10. A window frame according to any of Claims 1 to 7, wherein the securing means comprises screws arranged to pass through openings in the ends of the frame members and engage threaded with said spigots.
- 105     11. A window frame according to Claim 10, wherein the screws are provided on surfaces of the frame members and junction pieces which are obscured from view when the frame is in its position of use.
- 110     12. A window frame according to any of Claims 1 to 7, wherein the securing means comprises ribbing on the spigots serving in association with a solvent adhesive to bond the frame members and spigots to one another.
- 115     13. A window frame according to any of the preceding claims, wherein internal reinforcing members pass through the frame members and junction pieces to increase the rigidity of the assembled structure.
- 120     14. A window frame according to Claim 13, wherein the reinforcing members comprise tie

bars which are tensioned and secured in place by pressure plates and locking nuts on threaded ends of the tie bars.

15. A window frame according to Claim 14,  
5 wherein the body portions of the junction pieces have removable caps to provide access to the locking nuts.

16. A window frame according to Claim 14,  
wherein apertures are provided in the body  
10 portions of the junction pieces to provide access

to the locking nuts.

17. A window frame substantially as hereinbefore described with reference to the accompanying drawings.

15 18. Any novel subject matter or combination including novel subject matter herein disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.

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